1015-41-296 **Lubomir T. Dechevsky*** (ltd@hin.no), Narvik University College, 2 Lodve Lange's St., P.O.B. 385, N-8505 Narvik, Norway. *Best approximation of solutions of nonlinear operator equations and atomic decomposition of interpolation spaces.* Preliminary report.

Lipschitz strongly monotone operators acting between a Banach space X and its dual $X^*(H)$ pivotal to a Hilbert space H are homeomorphisms when X is H-reflexive. If, additionally, the norm in X is uniformly Frechet-differentiable, Lipschitz strongly accretive operators acting from X into itself are also homeomorphisms. These two results imply existence and uniqueness of the solutions of two general classes of nonlinear operator equations. Under very weak additional assumtions about X (which may here be quasi-Banach) there exist in X *normal approximation families* (NAF) with a *weak or strong approximation property*. When the NAF satisfies a consistent pair of a *direct* (Jackson-type) and an *inverse* (Bernstein/Markov-type) inequality, it is possible to characterize the best approximation to the solution of the nonlinear operator equation from any given NAF in terms of appropriate interpolation spaces. In particular, this is true when using Galerkin-Petrov projection methods in variational formulation with respect to the inner product in the underlying Hilbert space H. Of special interest for applications are *lacunary* multiresolution Galerkin-Petrov finite and boundary element methods based on a wavelet atomic decomposition of X. (Received February 07, 2006)